What is claimed is:

1. A metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising:

a core made of a platinum-group metal or refractory metal; and

a coating film formed on said core, said coating film having at least two layers which include a core-side inner layer of a Re-Cr based σ (sigma) phase, and a surface-side outermost layer of an aluminide or silicide.

2. A metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising:

a core made of an alloy containing a platinum-group metal or refractory metal, and Re and Cr diffused therein; and

a coating film formed on said core, said coating film having at least one layer which includes an aluminide or silicide layer.

3. A method for producing a metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising the steps of:

forming a material made of a platinum-group metal or refractory metal into a member having an intended shape;

coating said member with a film made of a Re-Cr alloy or a bilayer film consisting of a Re layer and a Cr layer;

subjecting said film-coated member to a heat treatment to allow said film to be formed as an inner layer of a Re-Cr based σ (sigma) phase; and

subjecting said heat-treated member to an aluminum or silicon diffusion coating to form an aluminide or silicide layer on said inner layer.

4. The method as defined in claim 3, which includes the step of forming a Cr film and an Al film on said inner layer of the Re-Cr based σ (sigma) phase, wherein the step of subjecting the

heat-treated member to an aluminum or silicon diffusion coating includes subjecting said member with said Cr and Al films to an aluminum diffusion coating at a given high temperature to allow said Cr and Al films to be formed as a Cr-aluminide layer.

5. The method as defined in claim 3, which includes the step of forming a Re film and an Al film on said inner layer of the Re-Cr based σ (sigma) phase, wherein the step of subjecting the heat-treated member to an aluminum or silicon diffusion coating includes subjecting said member with said Re and Al films to an aluminum diffusion coating at a given high temperature to allow said Re and Al films to be formed as a Re-aluminide layer.

6. The method as defined in claim 3, which includes the step of forming a Re film on said inner layer of the Re-Cr based σ (sigma) phase, wherein the step of subjecting the heat-treated member to an aluminum or silicon diffusion coating includes subjecting said member with said Re film to a silicon diffusion coating to allow said Re film to be formed as a Re-silicide layer.

7. A method for producing a metal-based resistance heat-generation element excellent in heat resistance and high-temperature corrosion resistance, comprising the steps of:

forming a material made of a platinum-group metal or refractory metal into a member having an intended shape;

coating said member with a film made of a Re-Cr alloy or a bilayer film consisting of a Re layer and a Cr layer;

subjecting said film-coated member to a heat treatment to diffuse Re and Cr into said member so as to convert said member into a platinum-group or refractory metal-Re-Cr alloy; and

subjecting said alloyed member to an aluminum or silicon diffusion coating to form an aluminide or silicide layer on said alloyed member.

8. The method as defined in claim 7, which includes the step of forming a Cr film and an Al film on said platinum-group or refractory metal-Re-Cr alloy, wherein the step of subjecting the alloyed member to an aluminum or silicon diffusion coating includes subjecting said alloyed

member with said Cr and Al films to an aluminum diffusion coating at a given high temperature to allow said Cr and Al films to be formed as a Cr-aluminide layer.

9. The method as defined in claim 7, which includes the step of forming a Re film on said platinum-group or refractory metal-Re-Cr alloy, wherein the step of subjecting the alloyed member to an aluminum or silicon diffusion coating includes subjecting said alloyed member with said Re film to a silicon diffusion coating to allow said Re film to be formed as a Re-silicide layer.